Procedure: Laboratory safety

Purpose

The purpose of this procedure is to define the requirements for working safely in laboratories at the Australian National University (University). The Laboratory Safety procedure ensures that legal and other obligations of the Work Health and Safety Act, 2011 (Cth), and the Work Health and Safety Regulations, 2011 (Cth), and the Safety, Rehabilitation and Compensation Act 1988 (Cth) are defined for managing the health and safety of all workers. This procedure is linked to the University’s Work health and safety Policy and is one of the Safe Work Procedures within the WHS Management System.

Definitions

A Laboratory is a place, building or part of a building used for scientific and related work that may be hazardous. The work conducted in a laboratory may include teaching or learning, research, clinical or diagnostic testing and analysis. A laboratory may have associated areas including preparation, instrumentation, decontamination, wash-up and storage rooms, or a workshop in an engineering area. Laboratories are commonly used for disciplines such as ranging from biology, radiation, chemistry, physics, botany and zoology, medicine, engineering, geology, agriculture and other related disciplines at the University.

Laboratory Supervisors are supervisors responsible for safety oversight of day-to-day laboratory operations.

Local area refers to a College, Research School or Service Divisions of the University.

A Worker is defined as anyone who carries out work for the University. A worker includes staff, volunteers, contractor, students and visitors at the University. WHS is Work Health and Safety.

Procedure

Scope

1. This procedure outlines requirements for the safe design and operation of laboratories within the University.
Responsibilities

2. Senior Managers or delegated representative are responsible for implementing and maintaining work health and safety standards and practices in laboratories in their respective areas. To maintain workplace health and safety, they should ensure that:

- laboratories and equipment provided for research and teaching are safe and suitable for the types of work carried out;
- resources are available for health and safety equipment and materials, as well as the maintenance of WHS standards;
- local area safe operating procedures are completed and accessible to all laboratory users; and
- compliance with relevant legislation and other conditions is occurring (e.g. radiation licence conditions, quarantine permit conditions).

3. Supervisors are responsible for:

- providing a safe and healthy workplace for all workers;
- ensuring that all workers are provided with appropriate induction, training, advice and supervision;
- providing documented safe work procedures and ensuring that the workers they supervise understand and comply with them;
- reporting any incidents, exposures, or hazards via the Workplace safety incident and hazard reporting tool;
- reporting any WHS concerns or matters within their jurisdiction to local WHS Officers;
- local area safe operating procedures are completed and accessible to all laboratory users; and
- compliance with relevant legislation and other conditions (e.g. radiation licence conditions, quarantine permit conditions).

4. WHS Officers shall monitor the following:

- the hazard assessment process, including controls to be implemented, shall be documented by the supervisor and the worker;
- safe work practices are developed and maintained at all times;
- regular safety inspections suitable for the work carried out are conducted and documented;
• any incidents, exposures, hazards or WHS concerns within their jurisdiction are reported to Work Environment Group (WEG);
• local area safe operating procedures are completed and accessible to all laboratory users; and
• compliance with relevant legislation and other conditions (e.g. radiation licence conditions, quarantine permit conditions).

5. Workers must take personal responsibility for ensuring their own safety and the safety of others by:

• reporting all incidents, injuries, or hazards via the Workplace safety incident and hazard reporting tool;
• reporting any WHS concerns or matters to their supervisor or local area WHS officer;
• taking the necessary action(s) to eliminate or minimise the risks of laboratory hazards over which they have control;
• complying with safety instructions, policies and procedures, including local area safety rules, manuals and documented hazard assessments;
• completing an appropriate local laboratory safety induction and training and all required training;
• making proper use of all safety devices and appropriate personal protective clothing and equipment as required;
• complying with the instructions given by emergency response personnel such as emergency wardens and first aid officers in an event of emergency;
• seeking information or advice where necessary before carrying out new or unfamiliar work;
• maintaining dress standards appropriate for the work being done (i.e. appropriate personal protective clothing, footwear and equipment must be worn and used at all times);
• only consuming or storing food and drink in designated areas outside the laboratory;
• being familiar with emergency (suitable for work being carried out) and evacuation procedures;
• complying with relevant legislation and other conditions (e.g. radiation licence conditions, quarantine permit conditions); and
• attending and completing University safety courses as identified by
supervisor.

**Laboratory design and construction**

6. Those responsible for the design and construction of laboratories (new or refurbishments) are to ensure general requirements are considered when planning for the construction of a new laboratory or refurbishment of an existing laboratory. The requirements are detailed in Australian Standards/ New Zealand Standards (AS/NZS) 2982 – Laboratory design and construction – Sections 1 to 7. Laboratories that are to be used for biological or radiological work have additional requirements as detailed in AS/NZS 2982 and other relevant Australian Standards.

7. Microbiological laboratories have specific containment requirements in addition to those specified in AS/NZS 2982. Refer to AS/NZS 2243.3 – Safety in laboratories for details. For Office of the Gene Technology Regulator (OGTR) certification requirements, please contact the University Institutional Biosafety Committee (IBC) on rdna.officer@anu.edu.au. For Biosecurity, quarantine and Department of Agriculture requirements, contact the Work Environment Group at whs@anu.edu.au.

**Hazard assessments**

8. Hazard assessments must be completed for all tasks being undertaken within the laboratory that involve hazardous substances (e.g. chemicals, biological, radiation, etc.) The laboratory supervisors are to ensure that this is completed.

9. Workers shall not commence work in a laboratory until they have completed a hazard assessment for all experiments involving a hazardous substance or procedure.

10. Risk Management is an ongoing process. Workplace hazards and risks should be reviewed regularly to ensure hazard assessments (and the controls in place to manage identified hazards and risks) are comprehensive, relevant, and up-to-date. Reviews should be conducted annually or whenever there is change in procedure or materials.

**Laboratory hazards**

11. Laboratory hazards fall into the following categories:

   - biological, such as pathogenic microorganisms, animals, biological tissues, and blood and other body fluids (human and animal);
   - chemical, such as corrosive, flammable, and toxic;
   - physical, such as noise, radiation, and manual handling; and
• electrical/mechanical, such as high voltage apparatus and machinery with moving parts.

**General laboratory safety rules**

12. Laboratory supervisors are to ensure, without limitation, that laboratory safety rules include and are being communicated effectively to those working within that space:

• immediately report all incidents/accidents/near-misses to supervisor;
• visitors must be accomplished by trained and authorised personnel and adhere to laboratory safety rules;
• food and drink (including from water bottles) must not be consumed in laboratories;
• laboratories are considered restricted access areas according to the University control of access to hazardous and restricted location procedure. Unauthorised entry or experimentation in these laboratories is strictly forbidden;
• be aware of the emergency facilities of the laboratory (i.e. location of safety showers, eyewash stations, fire extinguishers and emergency exits, duress buttons, emergency cut-off switches, LEL and oxygen-depletion gas alarms,);
• working spaces are to be kept clean;
• broken glass and sharps must be placed in appropriately marked bins (e.g. yellow sharp disposal containers for contaminated sharps) in the laboratory;
• plastic pipettes and pipette tips are to be treated as sharps;
• laboratory waste must be disposed according to the local area waste management plan and the Hazardous waste management Procedure;
• no waste is to be left or placed in the sinks. Liquid hazardous waste can only dispersed in dedicated sinks in accordance with laboratory, local area and Australian Capital Territory (ACT) Government Trade Waste management procedures or permits, contact WEG (whs@anu.edu.au) for more information;
• all spillages must be contained, cleaned up, and decontaminated immediately after they occur by using an appropriate spill kit;
• no samples are to be taken from, or brought into, the laboratory without authorisation;
• DO NOT pipette by mouth;
• defective equipment or broken lab equipment must be reported to the supervisor;
• radioactive sources (e.g. laser, UV sources, radioactive substance or arc lamp) shall only be used in designated laboratories designed for the safe use of the source;
• sitting on laboratory benches is prohibited;
• any open wounds must be covered (e.g. cuts, dermatitis on hands);
• for handling animals in dedicated animal laboratories, refer to Safety in animal houses procedure;
• children are not permitted in the laboratory, unless approved by local area management (e.g. school visits, open days) and supervision is provided;
• pregnant workers should advise their situation to their supervisor as soon as pregnancy is confirmed, to enable making tasks safe and healthy for them and their foetus;
• always wear task specific Personal Protective Equipment (PPE) as outlined in hazard assessments, Safety Data Sheets (SDS) or the Personal protective equipment procedure;
• always wash hands thoroughly and remove laboratory coats before leaving the laboratory;
• observe displayed safety signs;
• do not smoke in or around laboratories (the University is a smoke free campus); and
• contact the local WHS Officer, supervisor, or laboratory leaders if there are any matters of concern

**General PPE requirements**

13. As per the completed hazard assessment for the laboratory, PPE requirements while working in laboratories at a minimum include;
   • enclosed footwear;
   • lab coats;
   • safety goggles or glasses, unless exceptions are documented in the hazard assessment (such as microscopy work); and
   • gloves, as documented in the hazard assessment, safe operating procedure
and SDS.

14. For task specific PPE requirements, refer to hazard assessments and the Personal protective equipment procedure:

Managing chemical hazards

15. For detailed information, refer to the Chemical management policy.

Managing biological hazards

16. For detailed information, refer to the Biological safety procedure.

Managing radioactive hazards

17. For detailed information refer to the University Radiation safety policy, Radiation safety procedure and Nuclear safety procedure.

Managing electrical hazards

18. For detailed information, refer to the University Electrical safety procedure. All Electrical equipment to be current tested and tagged.

19. Switch off electrical appliances that do not need to be left on when equipment is not in use.

20. Unless otherwise fitted, use Residual Current Devices (RCDs) for all hand-held electrical appliances and ensure that all hand held electrical equipment is tested and tagged annually.

21. Do not use double adaptors or piggyback plugs. Use approved power boards fitted with overload protection as required.

22. It is prohibited to use electric open bar radiators, electric fan heaters, hair dryers and kerosene heaters in laboratory.

Fume cupboards

23. Fume cupboards must be correctly operated and maintained to ensure efficient extraction of hazardous fumes and to protect operators from potential harm.

24. Facilities and Services have all fume cupboards tested annually for compliance with AS/NZS 2243.8 Safety in laboratories: Fume cupboards.

25. It is important to carry out pre-operational safety checks, use fume cupboards correctly, and leave them in a condition that will avoid potential contamination of subsequent operators.

26. For detailed information, refer to the Managing fume exhaust system.
Emergency Information

27. For detailed information, refer to the University Emergency response procedure.

28. During business hours, emergency queries shall be made to the local area management, then Work Environment Group, HR Division (x52193). The local area is responsible for co-ordinating any Emergency Services response.

29. When emergencies occur after-hours, contact ANU Security (x52249) or 6125 2249.

30. Appropriate types and amounts of spill containment resources and absorbing materials shall be obtained and kept readily available before commencing any procedure with a hazardous substance. The response to a spill should be as indicated in the University Emergency response procedure and any local area procedures with specific risks identified.

31. It is the responsibility of all laboratory supervisors to ensure that everyone working in a laboratory is aware of emergency procedures and knows the location of:
   - the nearest fire extinguishers or fire blankets;
   - fire and emergency escape routes;
   - first aid attendant and first aid kit;
   - emergency shower and eye wash facilities;
   - local isolation devices for gas, water and power (where fitted);
   - emergency spill containment equipment and procedures; and
   - antidotes or neutralising agents for any special substances.

After hours work

32. Refer to local area induction document for detailed information.

33. Working out of normal hours raises a number of important safety issues. Work of a hazardous nature should not be done out of hours unless there are sufficient people present to provide assistance in case of an emergency. Document after-hours work within the hazard assessment. Always obtain supervisor approval before starting after hours work.

34. Supervisors need to consider the work being undertaken and the skill level/knowledge of workers before approving any out of hours work. They also
need to ensure procedures are in place to manage any issues that may arise. This will include the work itself and also how the person might travel between the building and their transport.

35. Approvals prior to after-hours work should be organised through supervisors or an authorised nominee. Request for approval must include specific reasons why access is necessary and what arrangements have been made for supervision.

**Working alone**

36. When working alone at any time and when planning after-hours work there are specific limitations on accessing workplaces and also on the types of work that may be undertaken.

37. If a person intends to work alone they must have permission to do so from their supervisor who has assessed the risks associated with the planned activities, considered the availability of any potentially required support services and concluded that such working arrangements are acceptable. This may include monitoring unattended reactions or experiments.

38. The existence of any medical condition that may give rise to a dangerous or life threatening situation when working alone must be disclosed to supervisor so that it can be taken into account.

**Incident reporting**

39. Reporting incidents, accidents, significant exposures and dangerous occurrences assists the University community avoiding repeated incidents. All incidents must be reported via the University’s Workplace safety incident and hazard reporting tool as per the WHS Incident management procedure.

**Sources**

<table>
<thead>
<tr>
<th>Legal and other requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Work Health And Safety Act 2011</em>(Cth)</td>
</tr>
<tr>
<td><em>Work Health And Safety Regulations 2011</em>(Cth)</td>
</tr>
<tr>
<td><em>AS/NZS 2243.1:2005– Safety in laboratories – Planning and operational aspects</em></td>
</tr>
<tr>
<td>Standard Number</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>AS/NZS 2243.2:2006</td>
</tr>
<tr>
<td>AS/NZS 2243.3:2010</td>
</tr>
<tr>
<td>AS 2243.4–1998</td>
</tr>
<tr>
<td>AS/NZS 2243.5:2004</td>
</tr>
<tr>
<td>AS/NZS 2243.6:2010</td>
</tr>
<tr>
<td>AS 2243.7–1991</td>
</tr>
<tr>
<td>AS/NZS 2243.8:2014</td>
</tr>
<tr>
<td>AS/NZS 2243.9:2009</td>
</tr>
<tr>
<td>AS/NZS 2243.10:2004</td>
</tr>
<tr>
<td>AS/NZS 2982:2010</td>
</tr>
<tr>
<td>AS/NZS 2243.8</td>
</tr>
</tbody>
</table>